

REMARKS/ARGUMENTS

Upon entry of this response, which does not amend the claims, claims 1-3, 6-8, 12-15, and 18-21 are pending in this application. All pending claims were rejected under 35 U.S.C. §103(a) as being unpatentable over Kwan et al., U.S. Patent No. 5,665,619 in view of Huang, U.S. 6,037,628. Applicants respectfully traverse the rejection and request reconsideration in view of the following remarks.

With reference to independent claim 1, the rejection refers to Figs. 1A-F and accompanying text in Kwan for the steps of forming a first trench extending into a substrate, lining the first trench with dielectric, substantially filling the first trench with conductive material, forming a body region, and after substantially filling the first trench with dielectric material, forming a source region inside the body region adjacent to the first trench. The rejection refers to Huang as showing a second trench that is etched to a shallower depth than the first trench.

This rejection is defective in part because no motivation to combine the references has been established. Moreover, even if motivation to combine could be established, the rejection would still fail to establish *prima facie* obviousness because the combination of Kwan and Huang would not teach or suggest all the features of claim 1.

For example, claim 1 recites a step of "forming a second trench adjacent to said source region, the second trench defined by sidewalls extending into the body and a bottom, which terminates below the source region and in contact with the body region." This step is not taught or suggested by Kwan and Huang.

Kwan does not teach or suggest a "second trench" as recited in claim 1 at all. This is apparent from inspecting the figures, none of which shows a trench "which terminates below the source region and *in contact with the body region*" (emphasis added) as recited in claim 1. Kwan discloses only gate trenches, which terminate in contact with the substrate *below* the body region (i.e., in a drain region).

Huang, unlike Kwan, does disclose (see Figs. 8 and 9) a trench 34 other than a gate trench that is filled with conductive material 36. As noted by Applicant in response to a

previous rejection based on Huang (see response filed April 3, 2002), trench 34 does not terminate "in contact with the body region" as recited in claim 1. Instead, the bottom of the trench terminates in contact with a heavily doped (P+) impurity region 35. As explained previously, this distinction is important because it demonstrates that the inventors in Huang were focused on establishing a low resistance contact by making sure the bottom of trench 34 was always made to be in contact with heavily doped impurity region 35. By contrast, the inventors of the methods claimed in the pending claims were not focused on establishing a low resistance contact. Rather, as highlighted in lines 23-25, on page 2 of the application, they were focused on "trench MOSFET structures and methods of manufacture" that would "improve ruggedness without compromising cell pitch or $R_{DS(on)}$." Consequently, the inventors of the presently claimed invention conceived methods to produce such structures (e.g., a device such as that illustrated in FIG. 2B).

For at least these reasons, claim 1 is patentable over the cited references. Similarly, independent claim 13 also recites a "process for manufacturing a trench field effect transistor" that includes a step of "etching a second trench through the source region and into the body region, the second trench defined by sidewalls and a bottom, which terminates in contact with the body region" (emphasis added) and is also patentable over the cited references for at least the reasons given above. The remaining claims depend from either claim 1 or claim 13 and derive patentability therefrom.

Accordingly, withdrawal of the rejection of claims 1-3, 6-8, 12-15, and 18-21 is respectfully requested.

CONCLUSION

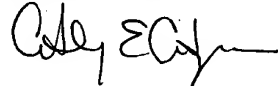
In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

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PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400, extension 5441.

Respectfully submitted,



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